DOOSAN **Document Transmittal** Upper Trishuli-1 HEP (216MW)	**Date** **2022-03-10**	**DT No.:** **UT1-HEP-DHI-PC-D-0012**	**SHEET** **1 OF 1**

DOOSAN NEPAL **BRANCH OFFICE**	**Address & Contact No. :** **Four Square Building, Naxal,** **Kathmandu, Nepal (P.O Box : 1387)** **+ 977 1 692 3014**	**Project No.** **H20002**	**DOCUMENT DISPATCHED BY** **Courier Service** ☐ **Messenger** ☐ **Post-Air Freight** ☐ **Document System or E-mail** ■ **By hand** ■
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SUBJECT	**Review Note RN-0082_Arrangement Drawing of Diversion Tunnel**		

S. N.	REVIEW NOTE NO.	REVIEW STATUS	DWG. / DOC. NO.	REV.	DWG. TITLE / DOC. DESCRIPTION	REMARK
1	RN-0082	RR	UT1-C-010-CVL-DG-42001	0C	Arrangement Drawing of Diversion Tunnel	3 SHEET
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Received by :

Date :

Legend of Review Status
A : APPROVED
AN : APPROVED AS NOTED
RR : RETURN FOR RESUBMISSION
FI : FOR INFORMATION

DHI STAMP

DOOSAN

Issued by DHI

for

Youngsoo Son

Project Manager

Email: youngsoo.son@doosan.com
Doosan Heavy Industries & Construction Co., Ltd.

Discipline : Civil

UPPER TRISHULI-1 HEP (216MW)

Client	**Nepal Water and Energy Development Company Private Limited**
Owner's Engineer	**Tractebel Engineering GmbH / Jade Consult**

REVIEW NOTE

Contractor	**Doosan Heavy Industries & Construction Co., Ltd.**		
Title of the Document	Arrangement Drawing of Diversion Tunnel, sheets 1-2		
Document No.	UT1-C-010-CVL-DG-42001	Revision	0C
Date of Documents	20.01.2022	Received Date	23.01.2022
Transmittal Form No.	UT1-HEP-DHI-D-0125		
Previous Review Date/Status	N/A	Prev. Review Note No.	N/A
Review Note No.	**RN-0082**	**Present Review Date**	**09.03.2022**
		Present Review Status	**RR**

A: Approved AN: Approved as Noted RR: Returned for Resubmission FI: For Information, only.

Comments:

- The document under this review is part of the Design Optimization Proposal Procedure.
- As the Diversion Tunnel is considered as a hydraulic tunnel with pressurized flow conditions with high flow velocities, reinforced concrete lining shall be considered all over the tunnel section, also in the roof, independent of rock class. This has to be considered in the excavation drawings as well.
- The design of the concrete pug is missing. Design of the concrete plug/ shape has to be considered in the excavation outline of the Diversion Tunnel.

Further OE´s comments are indicated in red in the Annex.

ANNEX:

UT1-C-010-CVL-DG-42001_0C, sheets 1 to 2, comments

DISCLAIME

Any approval will not release the Contractor from any of his obligations under the Contract.

Sebastian Beck, Chief Design Engineer

ANNEX A12
RN-0082
09/03/2022
Yeltsin Bek

GENGRAL PLAN OF DIVERSION TUNNEL

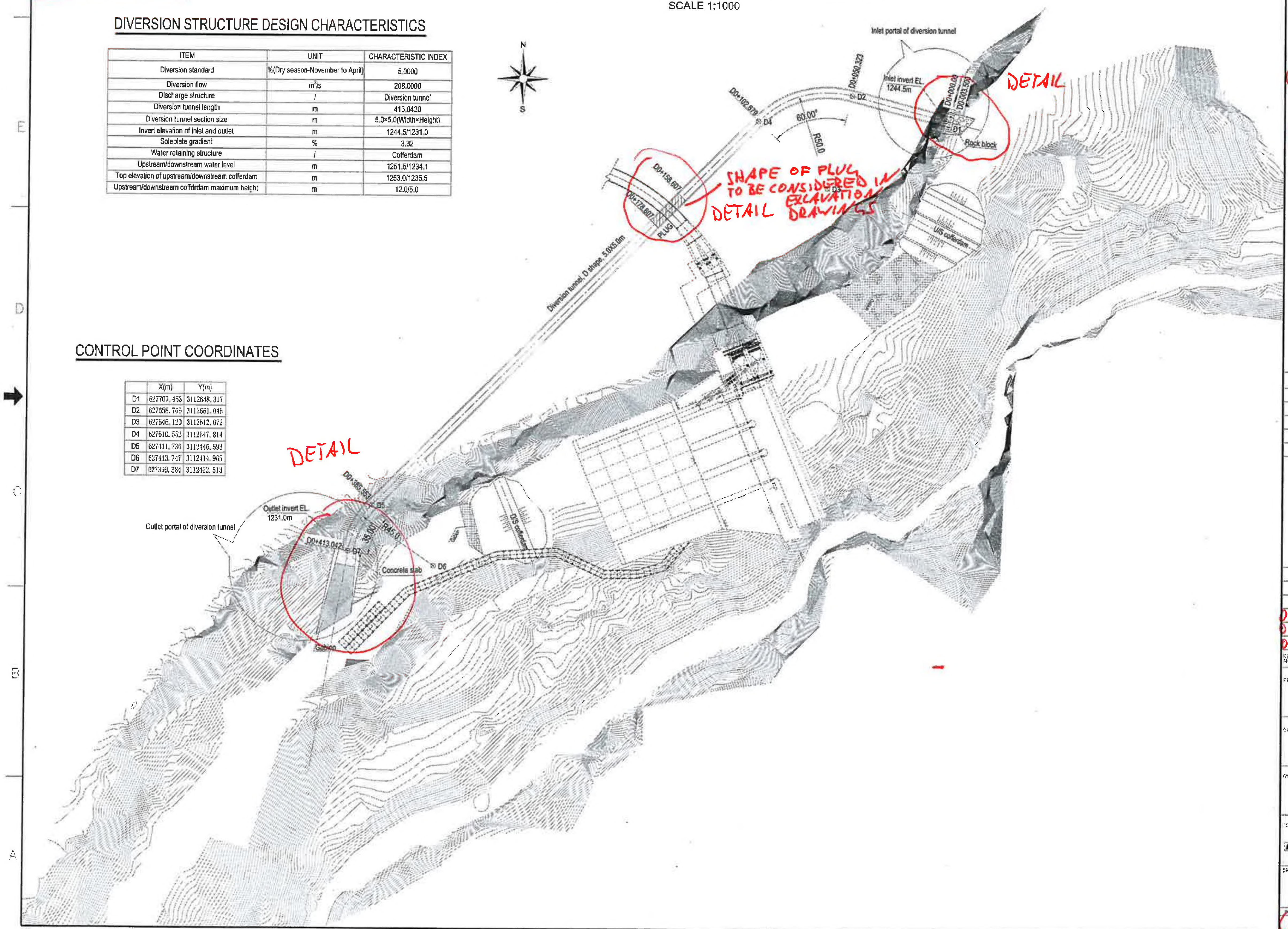
SCALE 1:1000

DIVERSION STRUCTURE DESIGN CHARACTERISTICS

ITEM	UNIT	CHARACTERISTIC INDEX
Diversion standard	%(Dry season-November to April)	5.0000
Diversion flow	m^3/s	208.0000
Discharge structure	/	Diversion tunnel
Diversion tunnel length	m	413.0420
Diversion tunnel section size	m	5.0×5.0(Width×Height)
Invert elevation of inlet and outlet	m	1244.5/1231.0
Soleplate gradient	%	3.32
Water retaining structure	/	Cofferdam
Upstream/downstream water level	m	1251.5/1234.1
Top elevation of upstream/downstream cofferdam	m	1253.0/1235.5
Upstream/downstream coffdrdam maximum height	m	12.0/5.0

CONTROL POINT COORDINATES

	X(m)	Y(m)
D1	627707.453	3112648.317
D2	627658.766	3112661.046
D3	627646.120	3112612.672
D4	627610.552	3112647.814
D5	627411.736	3112446.593
D6	627443.747	3112414.965
D7	627399.384	3112422.513


N
S
Inlet portal of diversion tunnel
Inlet invert EL. 1244.5m
D0+000.00
D0+003.50
D0+050.323
D0+102.679
D1
D2
D3
D4
60.00°
R50.0
Rock block
DETAIL
D0+158.607
D0+178.607
PLUG
SHAPE OF PLUG TO BE CONSIDERED IN EXCAVATION DRAWINGS
DETAIL
U/S cofferdam
Diversion tunnel, D shape, 5.0x5.0m
DETAIL
D0+385.553
D5
Outlet invert EL. 1231.0m
Outlet portal of diversion tunnel
R45.0
35.00
D0+413.042
D7
D6
Concrete slab
Gabion
D/S cofferdam

NOTE

1.This set of drawings are the arrangement of diversion tunnel.
2.Elevations and chainages are in meter, other dimensions are in centimeter.
3.Structures shown on the drawing with the exception of diversion tunnel are sketches only.
4.The diversion structure design characteristics table is tentative ✓
~~5.The alignment etc., location of portals etc. are subject to approval~~ OK
6.Scale:

1:1000 0 10 20 30 40 50m

SCALE IS NOT SUBJECT OF A NOTE

REFERENCE DRAWINGS

UT1-C-010-CVL-DG-42002	EXCAVATION AND SUPPORT DRAWING OF INLET AND OUTLET PORTAL OF DIVERSION TUNNEL
UT1-C-010-CVL-DG-42003	EXCAVATION AND INITIAL SUPPORT DRAWING OF DIVERSION TUNNEL

SYMBOL AND LEGEND

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REV. NO.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.
C	20.JAN.2022	IS-RN-0042	DONG Z.Z.	J.J.KIM	Y.S.SON
B	31 DEC.2021	FOR APPROVAL	DONG Z.Z.	J.J.KIM	Y.S.SON
A	25.DEC.2021	FOR APPROVAL	DONG Z.Z.	J.J.KIM	Y.S.SON

PROJECT TITLE

Upper Trishuli-1 HEP (216MW)

OWNER

NWEDC

OWNER'S ENGINEER

TRACTEBEL ENGIE
jade CONSULT

CONTRACTOR

DOOSAN Doosan Heavy Industries & Construction

DRAWING TITLE

ARRANGEMENT DRAWING OF DIVERSION TUNNEL(1/2)

SIZE	DRAWING NUMBER	SHEET NO.	REV. NO.
A	UT1-C-010-CVL-DG-42001	1 OF 2	C

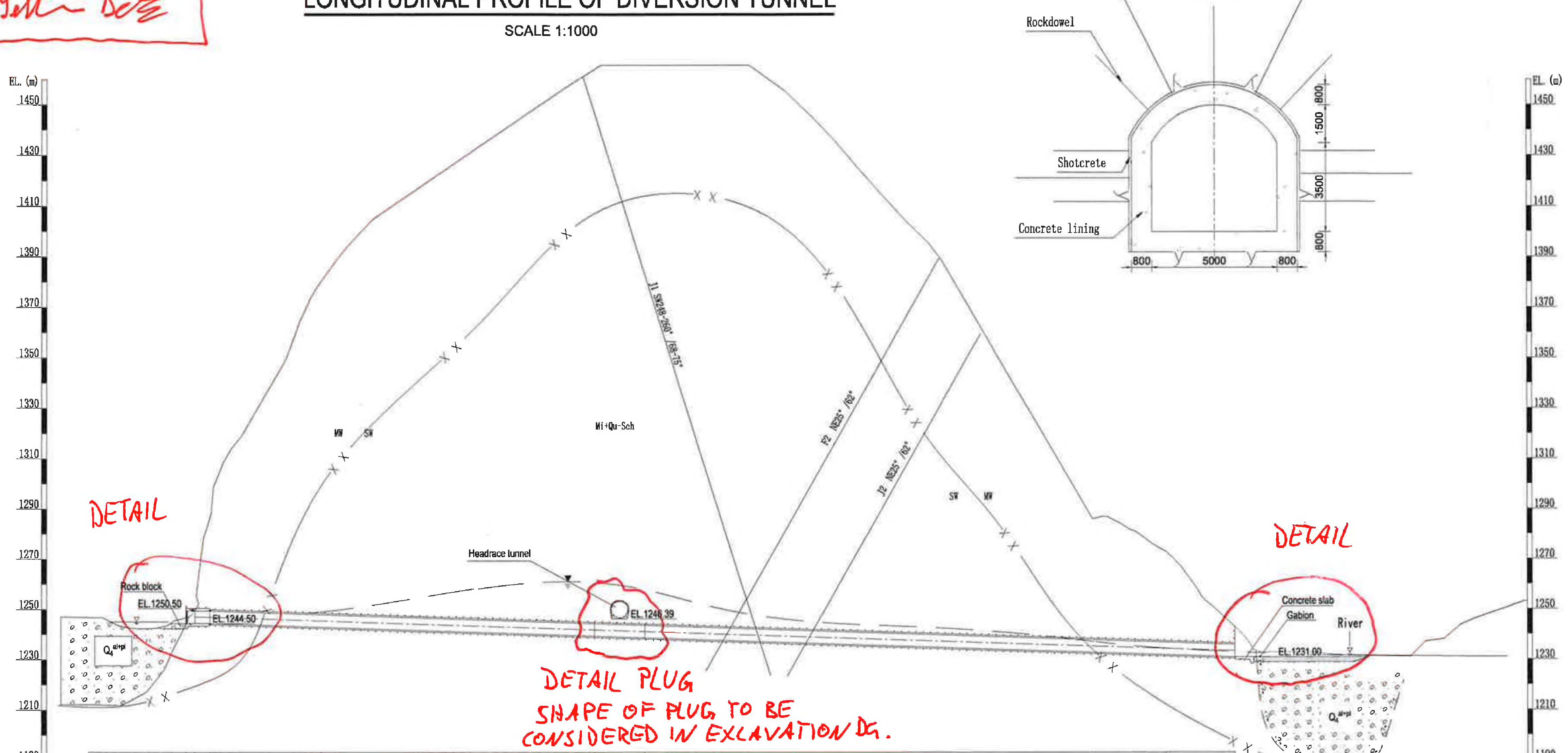
?

A1 (594 × 841 MM)

ANNEX 2.12
RN-0082
09/03/2022

LONGITUDINAL PROFILE OF DIVERSION TUNNEL

SCALE 1:1000


EL. (m)
1450
1430
1410
1390
1370
1350
1330
1310
1290
1270
1250
1230
1210
1190
MW
SW
Mi+Qu-Sch
J1 SW248-260° /68-75°
F2 NE25° /62°
J2 NE25° /62°
SW
MW
Headrace tunnel
Rock block
EL.1250.50
EL.1244.50
EL.1248.39
Concrete slab
Gabion
River
EL.1231.00
Q4al+pl
DETAIL
DETAIL

DETAIL PLUG
SHAPE OF PLUG TO BE CONSIDERED IN EXCAVATION DG.

CHAINAGE(m): EL.1244.50 D0-003.50 | D0+000.00 EL.1244.50 | D0+006.00 EL.1244.50 | D0+050.323 | BENDING SECTION | D0+102.679 | D0+158.607 | PLUG | D0+178.607 | D0+385.553 | BENDING SECTION | D0+413.042 EL.1231.00

Gradient: 0% | 3.32%

Rock class type: III | III~II | IV | III | IV

Overburden thickness(m): 149.60 | 222.37 | 218.22 | 64.60 | 6.6

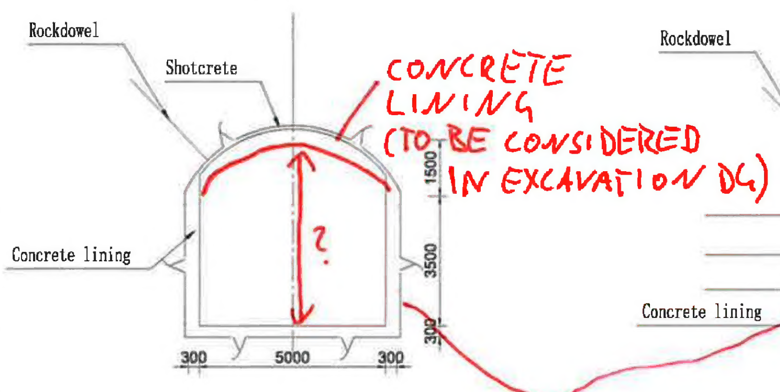
TYPICAL CROSS SECTION OF INTERSECTION OF HEADRACE AND DIVERSION TUNNEL

scale 1:100

Rockdowel
Shotcrete
Concrete lining
800
1500
3500
800
800
5000
800

TYPICAL CROSS SECTION OF II

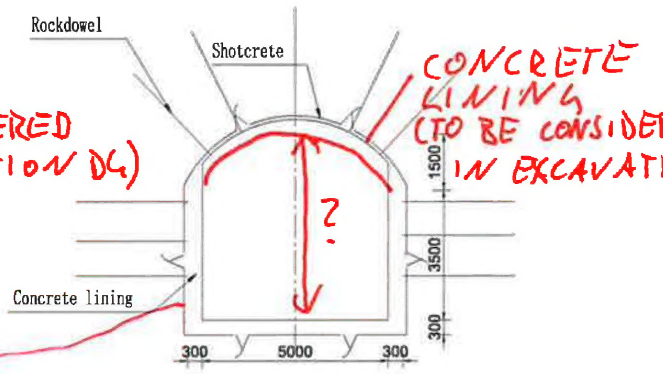
scale 1:100


Rockdowel
Shotcrete
Concrete lining
1500
3500
300
300
5000
300
?

CONCRETE LINING (TO BE CONSIDERED IN EXCAVATION DG)

TYPICAL CROSS SECTION OF IIIa,IIIb

scale 1:100

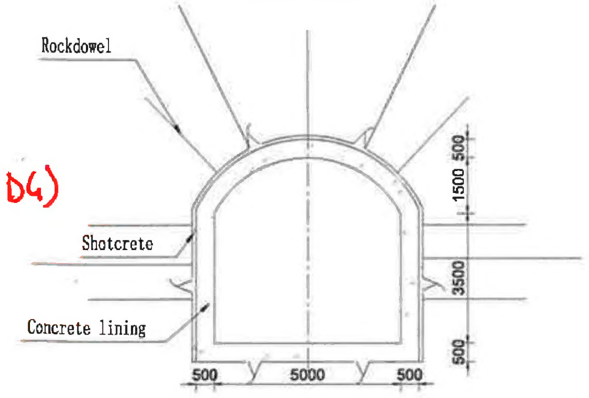

Rockdowel
Shotcrete
Concrete lining
1500
3500
300
300
5000
300
?

CONCRETE LINING (TO BE CONSIDERED IN EXCAVATION DG)

SHOTCRETE

TYPICAL CROSS SECTION OF IV

scale 1:100


Rockdowel
Shotcrete
Concrete lining
500
1500
3500
500
500
5000
500

NOTE

1.All dimensions are in millimeters, and coordinates, chainages & elevations are in meters.

2.Details of surrounding rock support and lining of each RMG refer to subsequent drawings.

3.The distribution of rock classes is tentative. ✓

~~4.Tunnel support and tunnel lining are subject to approval.~~ OK

5.Scale:

1:1000 0 10 20 30 40 50m

1:100 0 1 2 3 4 5m

→ NOT SUBJECT OF A NOTE

REFERENCE DRAWINGS

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TRACTEBEL ENGIE
jade CONSULT

CONTRACTOR

DOOSAN Doosan Heavy Industries & Construction

DRAWING TITLE

ARRANGEMENT DRAWING OF DIVERSION TUNNEL(2/2)

INDEX	DRAWING NUMBER	SHEET NO	REV. NO
A	UT1-C-010-CVL-DG-42001	2 OF 2	0C

?

A1 (594 x 841 MM)